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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,080	10/03/2001	Henry Sowizral	5181-68801 P5161	8117

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EXAMINER

ALAUBAIDI, HAYTHIM J

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Please find below and/or attached an Office communication concerning this application or proceeding.

PR29

Office Action Summary	Application No. 09/970,080	Applicant(s) SOWIZRAL ET AL.	
	Examiner Haythim J. Alaubaidi	Art Unit 2171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) 13-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 11, 12 and 33-41 is/are rejected.
- 7) ☒ Claim(s) 2-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4</u> . | 6) <input type="checkbox"/> Other: _____ |

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

A. Claims 1-12 and 33-41, are drawn to a data structure with image data management, classified in class 707, subclass 104.1; and

B. Claims 13-32 are drawn to a method for memory management with virtual scenes as in virtual reality, classified in class 711, subclass 6.

Inventions A - B are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention **A** has separate utility such as the data structure and image data management; and invention **B** has separate utility such as the virtual objects characterized in virtual reality and memory management. Each of the two inventions does not require the particulars of the other invention.

During a telephone conversation with Mr. Mark Brightwell on March 17, 2004 a provisional election was made with traverse to prosecute invention A, Claims 1-12 and 33-41. Affirmation of this election must be made by the Applicant in replying to this office action. Claims 13-32 are withdrawn from further consideration by the examiner, according to 37 CFR 1. 142(b), as being drawn to a non-elected invention.

DETAILED ACTION

2. This communication is in response to Application No. 09/970,080; filed on October 03, 2001.
3. Claims 1-41 are presented in the Application, of which Claims 13-32 are withdrawn from further consideration by the examiner, according to 37 CFR 1. 142(b), as being drawn to a non-elected invention.
4. Claims 1-12 and 33-41 are presented for examination following the election/restriction.
5. Claims 1, 11-12 and 33-41 are rejected under 35 U.S.C. 103(a).
6. Claims 2-10 are objected to as being dependent upon a rejected base claim.
7. Claims 34-38 are objected to because of minor informalities.

Claim Objections

8. Claims 34-38 are objected to because of the following informalities:

Claims 34-38 are showing as if they depend from Independent Claim 27, when in fact they further limit Independent Claim 33. The Examiner believes this to be a typographical error. An examination to the above claims was conducted as if they depend from Independent Claim 33. Appropriate correction is required.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1, 11, 33-39 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniel J. Woods (U.S. Patent No. 5,956,039 and Woods hereinafter) in view of Kazuki Matsui (U.S. Patent No. 6,437,778 and Matsui hereinafter).

Regarding Claims 1, 33 and 39, Woods discloses:

determining the current location for a viewpoint (Figure 6, Element 606 and corresponding text)

determining a current locality threshold (Figure 6, Element 602 and 604 and corresponding test)

determining which portion of the scene graph are relevant to the current locality threshold (Woods, Abstract; see also Col 3, Lines 58-65)

loading into a local memory those portions of the scene graph that are relevant within the current locality threshold (Col 3, Lines 58-65; see also Col 3, Line 66 through Col 4, Line 8; see also Col 6, Lines 35-36, i.e. The Anchor group node loads a new

scene into a VRML browser when one of its children is selected by the user; see also Col 6, Lines 41-42)

wherein the pointers indicate where the replaced portions may be loaded from if the replaced portions are needed (Col 6, Lines 16-23; see also Lines 26-35 and Line 36¹)

Woods reference discloses all of the claimed subject matter set forth above including replacing a scene with another one as needed (Col 6, Lines 41-42), except the reference does not explicitly indicate the steps of replacing portions of the scene graph that are not relevant within the current locality threshold with one or more pointers.

However Matsui teaches replacing portions of the scene graph that are not relevant within the current locality threshold with one or more pointers (Col 12, Lines 6-10; see also Figure 8 and corresponding text; see also Col 21, Lines 39-51 and other locations through the reference, especially in regard to wait memory 59; see also Col 22, Lines 27-36).

Given the intended broad application of the Woods system, it would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Woods with the teachings of Matsui to replace portions of the scene graph that are not relevant within the current locality threshold with one or more pointers, one reason would be to save memory space and to increase system performance especially when dealing with large amount of data such as in large Virtual Reality programs.

Regarding Claims 11 and 41, Matsui discloses wherein said replacing is performed only once a predetermined level of memory utilization is reached (Col 22, 24-28).

Regarding Claims 34 and 36, Woods discloses determining a current acceleration (Woods, Col 6, Lines 31-33, i.e. However as the observer moves closer to the object); and using the acceleration value to determine the predicted future viewpoint (Woods, Col 6, Lines 32-35; see also Matsui, Col 6, Lines 30-39).

Regarding Claim 35, Woods discloses rendering one or more frames based on the scene graph (Col 2, Lines 37-40).

Regarding Claim 37, Woods discloses application programming interface (Col 6, Lines 25-27; see also Figures 1 and 3).

Regarding Claim 38, Woods discloses graphics application (Col 5, Lines 15-20).

11. Claim 12, is rejected under 35 U.S.C. 103(a) as being unpatentable over Daniel J. Woods (U.S. Patent No. 5,956,039 and Woods hereinafter) in view of Kazuki Matsui (U.S. Patent No. 6,437,778 and Matsui hereinafter) and further in view of Lawrence P. Reed (U.S. Patent No. 5,577,180 and Reed hereinafter).

Regarding Claim 12, the combination of both Woods and Matsui references disclosed all of the claimed subject matter set forth above, except both references did not explicitly indicate the feature of employing hysteresis to prevent thrashing.

¹ As the system is able to tell which parent scene to load and from where if the user selected a child

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However, since this is a well known method used in memory management, the Examiner is using another reference for Reed to teach this feature. Reed teaches employing hysteresis to prevent thrashing (Col 4, Lines 36-43).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of both Woods and Matsui with the teachings of Reed to employ hysteresis in order to prevent thrashing, as it is well known in managing memory in order to minimize system usage of the processor and to increase the computer performance, in other words, to prevent the CPU processor from spending most of its time moving data between different levels of storage and little of it's time performing useful work (see the documentation attached for "Memory Management").

12. Claim 40, is rejected under 35 U.S.C. 103(a) as being unpatentable over Daniel J. Woods (U.S. Patent No. 5,956,039 and Woods hereinafter) in view of Kazuki Matsui (U.S. Patent No. 6,437,778 and Matsui hereinafter) and further in view of Kenneth E. Hoff III, ACM Crossroads Student Magazine, "Faster 3D game graphics by not drawing what is not seen").

Regarding Claim 40, the combination of both Woods and Matsui references disclosed all of the claimed subject matter set forth above, except both references did not explicitly indicate the feature of wherein the current locality threshold equals a

scene (Col 6, Lines 35-36) this is according to the references to other scenes mentioned in Col 6, Lines

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current view frustum. However Hoff III, teaches wherein the current locality threshold equals a current view frustum (Hoff III, Abstract; see also Pages, 3-4).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of both Woods and Matsui with the teachings of Hoff III, to make current locality threshold equals a current view frustum, in order to not waist any memory with scenes that are not visible to the user and to dramatically reduce the load on the graphics subsystems (Hoff III, Abstract).

Allowable Subject Matter

13. Claims 2-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is the Examiner's statement of reasons for the indication of allowable subject matter:

Regarding Claim 2, Applicant's particular system and associated methods in the environment of managing graphical scenes is loading into the local memory those portions of the scene graph that are relevant within the predicted future locality threshold, in combination with the limitation of wherein said replacing is performed only on portions of the scene graph that are not relevant within (i) the current locality threshold and (ii) the predicted future locality threshold record in combination with the

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other limitations of the claims, was not disclosed by, would not have been obvious over, nor would have been fairly suggested by the prior art of record or that encountered in searching of the prior art.

The dependent Claims 3-10 being further limiting to dependent Claim 2 definite and enabled by the Specification would also be allowed if its respective dependent Claim 2, was rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other Prior Art Made of Record

15. a. Farrell, (Programming in Windows 3.1; 2nd Edition);
b. Memory Management; Non Patent Literature, (www.cs.wpi.edu);
c. Becker, (U.S. Patent No. 6,301,579) discloses a method, system, and computer program product for visualizing a data structure;
d. Tesler, (U.S. Patent No. 6,137,499) discloses a method, system, and computer program product for visualizing data using partial hierarchies; and
e. Elliott et al. (U.S. Patent No. 5,764,241) discloses a method and system for modeling and presenting integrated media with a declarative modeling language for representing reactive behavior.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

Points of Contact

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Haythim J. Alaubaidi whose telephone number is (703) 305-1950. The examiner can normally be reached on Monday - Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic, can be reached on (703) 308-1436.

Any response to this office action should be mailed to:

The Commissioner of Patents and Trademarks, Washington, D.C. 20231 or telefax at our fax number (703) 872-9306.

Hand-delivered response should be brought to Crystal Park II, 2121 Crystal Drive, 6th Floor Receptionist, Arlington, Virginia. 22202.

Haythim J. Alaubaidi

Patent Examiner
Technology Center 2100
March 19, 2004


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